

Application No.: 10/723,389
Attorney Docket No.: 2003B103/2
Response dated: June 17, 2009
Reply to Office Action dated: April 2, 2009

REMARKS

Claims 36-39, 41-46, 49-61, 63, 64, 72-74, 76-78, 80, 81, 83-85 and 87-90 remain pending in the present application. New claims 91 and 92 are added, and find basis in claim 88. The claims are amended in order to address formal issues. No new matter is added.

Applicants would like to thank the Examiner and her supervisor for the opportunity to discuss this application during a telephone interview on June 11, 2009. During the interview, Applicants discussed the failure of the cited references to recognize the problems associated with Surface Melt Fracture, and thus the lack of any motivation to reposition the heating assemblies to be “at the exit opening in said downstream face” of the melt extrusion die. In reviewing the accompanying amendment and response, sent as a proposal to the Examiner in advance of the interview, the Examiner and her supervisor agreed that it would appear to overcome the outstanding rejections.

Applicants believe that the amendment addresses the Examiner’s objection to the claims and drawings.

Claims 41, 52 and 72 are rejected under **35 U.S.C. § 112**, second paragraph as indefinite. Applicants traverse this rejection and request reconsideration in view of the accompanying amendment.

Claim 72 is rejected under **35 U.S.C. § 112**, first paragraph as failing to comply with the written description requirement. Applicants traverse this rejection and request reconsideration in view of the accompanying amendment.

Claims 73, 74, 76-78, 80, 81, 83-85 and 90 are rejected under **35 U.S.C. § 102(b)** as anticipated by Ready et al. (U.S. 6,474,969). Applicants traverse this rejection, since Ready et

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al. fail to disclose or suggest an electrical heating element at the exit opening of the molten resin passage(s), as required by independent claims 73 and 80.

In contrast, Ready et al. disclose that their heating elements are disposed within annular grooves 24 and 26, which grooves are formed within and isolated by the material of die plate 12 (Fig. 3, col. 3, lines 51-60). The heating elements 28a and 28b of Ready et al. are clearly offset from the exit openings of extrusion orifices 22, which exist at cutting surface 21. As illustrated in Fig. 3, a significant portion of the cross-hatched material of die plate 12 exists between the outer boundaries of grooves 24 and 26, and the orifice exit opening at 21. Thus, the heating elements of Ready et al. are not at the exit opening.

At page 7 of the outstanding Office Action, the Examiner states that the:

electrical heating element (28a, 28b) [is] proximate the downstream face and proximate with the one passage (24, 26) at the downstream opening...

However, the “passages” 24 and 26 of Ready et al. are not passages for molten polymer at all, but instead are annular grooves which contain the wound wire heating elements, which do not open to the cutting face 20 of die plate 12. Further, the heating elements are not disposed at the exit opening, as claimed herein.

For anticipation to exist,

[t]he identical invention must be shown in as complete detail as is contained in the ... claim. Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Emphasis added.

In response to Applicants assertions as to the importance of the heater being at the exit opening, the Examiner states:

In response to Applicant's arguments, Ready discloses a die plate having upstream face and downstream face, wherein die plate comprises passage, wherein passage comprises first opening and orifice (22) as second exit opening, wherein orifice is intended to exit the molten material in the shape of the orifice; and cutting means

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(21) is disposed near the second exit opening (22) of the passage of the plate, in order to cut extrudate (See figure 3). Figure 3 further shows that the die plate (12) comprises a plurality of heaters (28a, 28b) which are disposed around the passages, wherein heater (28a) having a dimension which is able to proximate the passage at exit opening, so the molten material remains in molten state while it exits from the passage. It is not necessary that the prior art suggests expressly or in so many words the changes or possible improvements the inventor made but that the knowledge is clearly present. *In re Sernaker*, 217 USPQ 1 (Fed. Cir. 1983). (Office Action, page 18, last paragraph; emphasis added).

The Examiner seems to be arguing that “close is close enough” in the highlighted phrase of the quoted passage. Applicants respectfully submit that in spite of the Examiner’s statement the Ready et al. disclosure is inadequate to establish a *prima facie* case of anticipation. The heating elements of Ready et al. are not at the exit opening of the polymer flow passage, and thus the prior art is not identical to the claimed invention, per Richardson v. Suzuki Motor Co, *Id.*

Withdrawal of the rejection is requested on this basis.

Further, as to the Examiner’s assertions with respect to the “insulation material”, presumably of claims 88-90, Applicants respectfully submit that the “thermally conductive paste” of Ready et al. cannot be considered an “insulation” material if it is disclosed on its face to be “thermally conductive”. Something which is conductive is the exact opposite of something which is insulative.

Claims 36-39, 41-46, 49-61, 63, 64 and 72 are rejected under **35 U.S.C. § 103(a)** as obvious over Ready et al. (U.S. 6,474,969). Applicants traverse this rejection, since Ready et al. fail to disclose or suggest an electrical heating element at the exit opening of the molten resin passage(s), as required by independent claims 36 and 51, nor a monolithic heater as set forth in claim 72.

In contrast, Ready et al. disclose that their heating elements are disposed within annular grooves 24 and 26, which grooves are formed within and isolated by the material of die plate 12 (Fig. 3, col. 3, lines 51-60). The heating elements 28a and 28b of Ready et al. are clearly offset from the exit openings of extrusion orifices 22, which exist at cutting surface 21. As illustrated

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in Fig. 3, a significant portion of the cross-hatched material of die plate 12 exists between the outer boundaries of grooves 24 and 26, and the orifice exit opening at 21. Thus, the heating elements of Ready et al. are not at the exit opening.

At page 7 of the outstanding Office Action, the Examiner states that the:

electrical heating element (28a, 28b) [is] proximate the downstream face and proximate with the one passage (24, 26) at the downstream opening...

However, the “passages” 24 and 26 of Ready et al. are not passages for molten polymer at all, but instead are annular grooves which contain the wound wire heating elements, which do not open to the cutting face 20 of die plate 12. Further, the heating elements are not disposed at the exit opening, as claimed herein.

Further, there is nothing in Ready et al. which would motivate the skilled artisan to modify the Ready et al. die plate in the manner of the present invention, i.e. so as to move the heating elements to a position at the exit openings of the resin passages.

Returning to the Examiner’s quoted passage, above, the Examiner seems to argue that the Ready et al. apparatus would function in a manner similar to that of the presently claimed invention, despite the fact that the heating elements are not disposed at the exit opening, as claimed herein.

Figure 3 further shows that the die plate (12) comprises a plurality of heaters (28a, 28b) which are disposed around the passages, wherein heater (28a) having a dimension which is able to proximate the passage at exit opening, so the molten material remains in molten state while it exits from the passage. It is not necessary that the prior art suggests expressly or in so many words the changes or possible improvements the inventor made but that the knowledge is clearly present. *In re Sernaker*, 217 USPQ 1 (Fed. Cir. 1983). (Office Action, page 18, last paragraph; emphasis added).

Applicants respectfully traverse the Examiner’s finding that “the knowledge” of Applicants’ improvements “is clearly present” in Ready et al. Applicants have cited Ready et al.

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at paragraph [0008] of the present specification (U.S. 2005/0074609), but have clearly found it lacking. In fact, Ready et al. is entirely silent as to the issues raised in the background of the present specification with respect to formation of surface melt fracture (SMF) defects when extruding low melt index polymers, especially metallocene LLDPE [0003]-[0004]. Ready et al. address the problem of premature solidification of polymer within the extrusion die (col. 1, lines 51-53), and not SMF defects.

In contrast, Applicants disclose that in order to reduce SMF defects, it is necessary to maintain the exit portion of the extrusion die at a temperature about 30°C above the extruding bulk melt temperature [0034], which they accomplish by positioning the heater(s) at the exit openings of the polymer extrusion passages.

There is absolutely no evidence that such “knowledge is clearly present” in the Ready et al. disclosure; in fact it is clearly absent. Further, there is no motivation for the skilled artisan to modify the Ready et al. device in the manner of the present claims.

Likewise, Ready et al. entirely fail to disclose or suggest a monolithic heater as set forth in claim 72, which is configured for retrofitting a resin shaping apparatus so as to provide the benefits of the present disclosure.

Clearly, Ready et al. fail to teach or even suggest each and every claim limitation. Withdrawal of the rejection for failure to establish a *prima facie* case of obviousness as to the present claims is requested.

Claims 36-39, 43-46, 51-53, 56-61, 72-74, 76-77, 80, 81, and 83-84 are rejected under **35 U.S.C. § 103(a)** as obvious over Leffew et al. (U.S. 6,409,491). Applicants traverse this rejection, since Leffew et al. fail to disclose or suggest an electrical heating element at the exit opening of the molten resin passage(s), as required by independent claims 36, 51, 73 and 80. Likewise, Leffew et al. fail to disclose or suggest a monolithic heater having a first face to engage at least one extrusion die orifice (claim 72).

In contrast, Leffew et al. disclose an extrusion die assembly which has a series of radially distributed extrusion barrels 1, each of which has a heater 2 press-fit on the outside. The heaters

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2 are not disposed at the exit openings 12, but are offset therefrom by air-gap 8 and some of the cross-hatched material of die plate 4 (col. 2, line 60, bridging to col. 3, line 7; Fig. 1).

At page 11 of the Office Action, the Examiner indicates that:

heater (2) [is] proximate said downstream face (12) and proximate with the passage (1) at the down stream opening...

Again, “close” or “proximate” is not the same as “at the exit opening”, and therefore cannot be said to meet the present claim limitations.

The Examiner has further argued (similar to her arguments as to Ready et al.) that the Leffew et al. disclosure clearly contains the knowledge that Applicants provide and claim herein (Office Action, page 20, first paragraph).

Like Ready et al., Leffew et al. addresses the problem of premature solidification of polymer melt at the exit orifices (col. 1, lines 32-37), and is entirely silent as to SMF defects. Thus, it is clear that the knowledge provided by the present application is entirely absent from Leffew et al., and as such the reference cannot have provided one skilled in the art with motivation to modify the Leffew et al. device in the manner of the present claims. Thus, Leffew et al. fail to teach or even suggest each and every claim limitation.

Accordingly, no *prima facie* case of obviousness can be said to exist when comparing Leffew et al. to the rejected claims. Withdrawal of the rejection is requested.

Claims 41, 42, 49, 50, 54, 55, 63, 64, 78, 85 and 90 are rejected under **35 U.S.C. § 103(a)** as obvious over Leffew et al. in view of Dudley (U.S. 4,123,207). Applicants traverse this rejection, since Leffew et al. fail to disclose or suggest an electrical heating element at the exit opening of the molten resin passage(s), as required by independent claims 36, 51, 73 and 80. Applicants reiterate their comments in traverse of the application of Leffew et al. to the present claims, as set forth above.

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Dudley discloses an underwater pelletizer and heat exchanger die plate combination for solidifying molten polymer entering the machine at one end and cutting the solidified fibers into small pieces or pellets (abstract).

Similar to Ready et al. and Leffew et al., Dudley is directed to preventing premature solidification of polymer at exit orifices of his extrusion die (col. 1, lines 36-40), and is entirely silent as to SMF defects.

Accordingly, Dudley could not have provided motivation to the skilled artisan to modify the Leffew et al. device in the manner of the present claims.

As such, even in combination the cited references fail to disclose or suggest each and every claim limitation, and cannot therefore establish a *prima facie* case of obviousness as to the present claims. Withdrawal of the rejection is requested.

New Reference Cited During Interview

During the course of the telephone interview of June 11, 2009, the Examiner directed attention to Courval et al. (U.S. Patent No. 5,204,045), and indicated that Courval et al. disclose an extrusion device having heating elements at the exit opening of the extrusion die.

Courval et al. disclose a solid state extrusion process wherein a semi-crystalline polymer billet is extruded through a die at the end of a pressure chamber (Abstract). Applicants note that Courval et al. does not disclose a melt extrusion process, but instead a pressure extrusion process, wherein the polymer billet is raised to a temperature below its melting point (col. 5, lines 8-12). In Fig. 3, Courval et al. disclose a schematic representation of their extrusion die, which has a band heater 28 surrounding a land portion 25 of the die 14.

Obviously, since Courval et al. is not directed to melt processing/extrusion, the heater would not be able to, or be intended to raise the polymer to a “temperature being from 30-170°C above bulk temperature T_{melt} ”, as required by the present claims.

Further, Applicants note that while the heater band 28 of Courval et al. is arguably “at” the die exit, it is not “in the downstream face” of the die, as required by the present claims. Instead, the Courval et al. band heater 28 is disclosed to surround the land portion 25 of the die

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14, which is most likely adequate for the processing of Courval et al., but unlikely to be sufficient for melt extrusion.

Accordingly, Applicants consider Courval et al. inapposite as to the presently claimed invention.

Applicants earnestly solicit a notice of allowance as to the present claims.

Applicants invite the Examiner to telephone the undersigned attorney, if there are any issues outstanding which have not been presented to the Examiner's satisfaction. If necessary to affect a timely response, this paper should be considered as a petition for Extension of Time sufficient to affect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1712.

Respectfully submitted,

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/Frank E. Reid/

Frank E. Reid
Attorney for Applicants
U.S. Reg. No.: 37,918

ExxonMobil Chemical Company
Law Technology
P.O. Box 2149
Baytown, Texas 77522-2149
(281) 834-1743 (Office)
(281) 834-2495 (facsimile)